by spraying these slurry solutions onto heated substrates so as to deposit particles by slurry spraying, and simultaneously by co-depositing Cu_xO by spray pyrolysis so as to partially intercalate the particles.

Although this invention is described with respect to a set of preferred aspects and embodiments, modifications thereto will be apparent to those skilled in the art. Therefore, the scope of the invention is to be determined by reference to the claims which follow. Throughout the text and the claims, use of the word "about" in relation to a range of numbers is intended to modify both the low and the high values stated.

WHAT IS CLAIMED

1. A method for making mixed-metal particles, comprising:

preparing a solution selected from the group consisting of a solution comprising two or more dissolved metals and/or metal-containing compounds comprising metals selected from Group IIB, a solution comprising two or more dissolved metals and/or metal-containing compounds comprising at least one each metal selected from Groups IB and IIIB, and a solution comprising two or more dissolved metals and/or metal-containing compounds comprising at least one each metal selected from Groups IIIB and IVB;

forming droplets of the solution; and

heating the droplets to pyrolyze the contents of the droplets to form mixed-metal particles.

2. A method according to claim 1, wherein the mixed-metal particles are a single-phase metal oxide.

3. A method according to claim 1, wherein the mixed-metal particles comprise multiple metal oxide phases.

4. A method according to claim 1, wherein the mixed-metal particles comprise a metal oxide phase and a non-oxide phase.

5. A method according to claim 1, wherein the mixed-metal particles are multinary metallic particles.

6. A method according to claim 1, wherein the mixed-metal particles comprise at least one phase substantially enveloping at least one other phase

7. A method according to claim 1, wherein the particles comprise Cu and In and have an average diameter of less than about 1 micron.

8. A method according to claim 1, wherein the particles comprise Cu, In and Ga.

9. A process for making a mixed-metal compound material, comprising:

reacting (a) a precursor material comprising multi-phase, mixed-metal particles comprising a metal oxide phase, with (b) at least one reactant material, to form a mixed-metal compound material.

10. A process according to claim 9, wherein the multi-phase, mixed-metal particles comprise multiple metal oxide phases.

11. A process according to claim 9, wherein the multi-phase, mixed-metal particles comprise at least one phase substantially enveloping at least one other phase.

12. A process according to claim 9, wherein the precursor material comprises multi-phase particulate materials and other particulate materials.

13. A process according to claim 9, wherein the reactant materials are present as particles admixed with the precursor material or as layers overcoated on to the precursor material.

14. A process according to claim 9, wherein the mixed-metal compound material is a Group VB or VIB compound material and wherein at least one of the reactant materials comprises one or more Group VB or VIB elements.

15. A process according to claim 9, wherein the particles comprise one or more elements from Groups IB and/or IIIB.

16. A process for making a mixed-metal compound material, comprising:

reacting (a) a precursor material comprising multi-phase, mixed-metal particles comprising a metal oxide phase and a non-oxide phase, with (b) at least one reactant material, to form a mixed-metal compound material.

17. A process according to claim 16, wherein the non-oxide phase comprises a

metal phase.

18. A process according to claim 16, wherein the non-oxide phase is a non-oxide chalcogenide compound.

19. A process according to claim 16, wherein the multi-phase, mixed-metal particles comprise at least one phase substantially enveloping at least one other phase.

20. A process according to claim 16, wherein the precursor material comprises other particulate materials in addition to the multi-phase, mixed-metal, particulate materials.

21. A process according to claim 16, wherein the precursor material is deposited as one or more layers on a substrate.

22. A process according to claim 16, wherein the reactant materials are present as particles admixed with the precursor material or as layers overcoated on the precursor material.

23. A process according to claim 16, wherein the mixed-metal compound material is a Group VB or VIB compound material and wherein at least one of the reactant materials comprises one or more Group VB or VIB elements.

24. A process according to claim 16, wherein the particles comprise one or more elements from Groups IB and/or IIIB.